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April 21, 1995

William F. Caton, Acting Secretary  
Federal Communications Commission  
1919 M Street, NW Room 222  
Washington, DC 20554

DOCKET FILE COPY ORIGINAL

Re: NPRM 93-61, FCC 95-41 Petition for Reconsideration

Enclosed is an original and 11 copies of Uniplex Corporation's Petition for Reconsideration in this matter.

Sincerely,

UNIPLEX CORPORATION

  
McNeil Bryan

President

No. of Copies rec'd  
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**2905 Country Drive  
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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

## Amendment of Part 90 of the Commissions Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems

# Uniplex Corporation Petition for Reconsideration

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ask the Commission to reconsider power limitations for this service and/or to relax antenna site restrictions for grandfathered systems employing this technology so that they may be built out under grandfathered conditions to the same extent as NBFL systems can be.

*Understanding the Difference Between WBFL and NBFL Location.* Our understanding is that NBFL systems such as those employed by Teletrac, MobileVision and SBMS transmit a high power narrowband paging-like signal from licensed sites to mobiles who in turn respond with a wide band pulse which is received at multiple licensed or unlicensed sites. The time-of-arrival information of the mobile signal is relayed to a central computer or subscriber computer where position of the mobile is calculated and displayed or stored. In broad terms it could be said that NBFL technology provides location of a transmitter.

Our WBFL, in its preferred configuration, periodically launches a wideband "Token" packet which circulates between the licensed base stations and is overheard by mobiles. The Token may contain general information such as traffic updates that are useful to the mobiles but its primary purpose is to permit the mobiles to calculate their own position without any further radio traffic. This is done by a multilateration method that compares the apparent time of arrival differences between pairs of base stations. Thus it could be said that WBFL technology provides location of a receiver.

This difference in system architecture has a bearing on certain network service offerings and network capacity. The following observations are based on our knowledge of current NBFL systems and estimates of our system performance:

1. Tracking of persons. An NBFL system attempting to track persons such as the case of Alzheimers patients or electronic prisoners would have to periodically transmit a fairly high powered signal from the person. This would require battery capacity

which would exceed the weight and bulk that could be practically worn by a person. The WBFL system would only have to briefly power up a receiver at certain Token passing intervals allowing a practical battery weight and life much like a paging receiver. The unit only transmits on request or activation so that battery size is practical.

2. **Network Capacity.** Capacity of NBFL systems is limited by the system's communications links which are required to interrogate and communicate with mobiles frequently in order to maintain a "fresh" database of mobile locations. Our WBFL system has an infinite capacity for location users some of whom may use other networks for their communication functions because location can be determined by a receiver. Cellular networks could incorporate our location receivers in cellular phones in order to provide Enhanced 911 services, for example. Other wireless networks such as CDPD could also incorporate our devices and services to replace or compliment GPS location.
3. **Distributed Intelligence.** NBFL systems must constantly query mobiles and store their locations in a central or subscriber database in order to perform intelligent dispatching with "fresh" location data. Our WBFL system allows intelligence to be distributed in the mobile itself which permits less use of airtime in some applications. We call it trading silicon for airtime.

Consider the case of a metropolitan transportation system with 500 buses. If the requirement is that central dispatch be alerted to all instances of busses running 2 minutes or more off schedule, a central intelligence system would have to query all 500 buses every 2 minutes. With the Uniplex SpyderNet distributed intelligence system, each bus would have its own on-board computer with it's stored schedules. Every 20 seconds or so, when a position fix is received, it would make

an on-time determination and only report behind schedule by exception to the central dispatch.

A home prisoner monitoring bracelet could operate in a similar manner when miniaturized low power consumption hardware is developed. Presently such systems consist of low power transmitters worn as a leg or arm bracelet and a home unit that simply reports via telephone that the person has gone out of range. Courts are reluctant to sentence many cases to this type of system because there is no control of the person's whereabouts when he leaves home for an authorized period to go to work, attend AA meetings etc.

With our WBFL distributed intelligence approach, the prisoner's bracelet would be programmed with his weekly itinerary which would be periodically compared with position fixes obtained from the network. Should the prisoner deviate from the allowed schedule he will be warned by the bracelet and the bracelet, in turn will report the exception via the network. Again, because the need to transmit is rare power consumption can be held to a practical level.

4. Infrastructure Requirements. Because an NBFL system can employ any desired number of unlicensed receive stations its coverage area is only limited by the reach of its high power forward link to a mobile. A mobile need only hear one licensed transmit site to initiate a response to unlicensed receive sites. Thus in most markets where an NBFL system is grandfathered it is likely that a few of its licensed sites in combination with many unlicensed receive sites will provide enough coverage for an economically viable system.

Our WBFL system on the other hand requires that the mobile hear four licensed transmit sites. Thus, setting aside the allowed power disparity of 300 watts vs 30 watts, our system requires about four times as many licensed sites as a typical

NBFL system. The total number of sites each system requires for comparable coverage is likely to be similar but our sites are all low duty cycle transmit sites.

This inequity in the effectiveness of the grandfathered rights of each system is further amplified by the 30 watt limitation the Commission has imposed on WBFL power levels. A rule of thumb suggests that range is halved when power levels are reduced ten fold as is the case under the new rules. This suggests that the density of licensed sites in our system must increase four fold to compensate.

*Items for Reconsideration.* The Commission should recognize that the Report and Order in this matter is highly biased to favor NBFL technology and does not permit the emergence of new approaches which may better serve the public through a greater diversity of service offerings and more efficient use of the spectrum. Further, we ask that the Commission recognize that our significant investment in financial and human resources was made on good faith reliance on the Interim Rules which we believe only embrace a WBFL technology.

Therefore we ask that the Commission reconsider certain elements of its rules which would place WBFL systems on a more "level playing field" with NBFL systems particularly under grandfathered conditions. Specifically we ask that the site limitations under grandfather rules be liberalized for systems primarily dependent on a WBFL to provide location services to permit additional site deployment within a 30 mile radius of the primary licensed site. Such an expansion is justified to enable a WBFL operator to offer service to an area similar to a typical grandfathered NBFL licensee whose service area would be bound by the range of his outer most 300 watt NBFL sites.

Further, as a separate issue or in combination with the above, we ask the Commission to place a duty cycle limitation on 300 Watt WBFLs instead of requiring power reduction.

#### **Emission Mask Specification §90.202 (m)**

*Summary.* The new bandwidth limitations specification, 90.202 (m) for LMS systems is impossible to meet. Every LMS provider disagreed with this specification when it was proposed. We support the paper and recommendations submitted to the Commission by MobileVision in their Petition for Reconsideration.

*Recommended Band Mask. (By MobileVision)* It is highly recommended that the following specifications be adopted for 90.209(m):

For LMS wideband emissions, operating in the 902-928 MHz band, in any 100 kHz band, the center frequency of which is removed from the center of the authorized sub-bands(s) by more than 50 percent up to and including 250 percent of the authorized bandwidth: The mean power of emissions shall be attenuated below the maximum permitted output power (a maximum permitted output power of 30 W is assumed, any variation in the permitted output power may require a modification of the equation), as specified by the following equation but in no case less than 31 dB:

$$A = 16 + 0.4 (P \times 50) + 10 \log B \text{ (attenuation greater than 66 dB is not required)}$$

where: A = attenuation (in decibels) below the maximum permitted output power level,

P = percent removed from the center of the authorized sub-band(s),

B = authorized bandwidth in megahertz."

For LMS narrowband forward link emissions, the power of any emission shall be attenuated below the transmitter power (P), in accordance with the following schedule:

i) on any frequency outside the authorized sub-band and removed from the edges of the authorized sub-band by a displacement frequency ( $f_d$  in kHz): at least  $116 \log_{10} ((f_d+10)/6.1)$  decibels or  $50 + 10 \log_{10} (P)$  decibels or 70 decibels, whichever is the lesser attenuation. A minimum spectrum analyzer resolution bandwidth of 300 Hz shall be used when showing compliance.

#### **Interference From Part 15 and Amateur Operations §90.361 (c)**

*Summary.* The issue of potential interference to LMS fixed sites is of extreme importance to LMS providers. Leasing and construction of LMS fixed sites represents a considerable financial and human resource investment. Abandoning or moving the site to accommodate a Part 15 operator is not only costly to the LMS provider but could be disruptive to important services provided to public service agencies and others.

Under the current rule it would be possible for a Part 15 operator to intentionally place a device in operation that met the antenna height restriction and direct the emissions at an LMS antenna. The intent could be to render the LMS site useless in order to extract "Greenmail" from the LMS provider.

In fact work done by MobileVision suggests that a Part 15 device radiating 6 dbi will desensitize an LMS receiver 10 db at a range of 4.5 miles! This suggests that a considerable interference threat to LMS systems exists from unintentional radiators as well. LMS cannot emerge as a viable industry under these conditions.

In our opinion, if a Part 15 vs LMS interference issue were subjected to litigation or arbitration purely on the basis of resolving the issue in the public interest, the LMS provider would invariably prevail. This is based upon the likelihood that the LMS provider could show that the site is an important link in providing LMS services to perhaps



thousands of users, it cannot readily be moved physically or in frequency and it represents a considerable investment by the LMS provider. We assume typical Part 15 sites likely serve few (a cordless phone), can easily be moved physically or in frequency and do not represent a large investment.

*Proposed.* If the Commission is serious about creating an LMS service it should accept the inevitable outcome of this issue and restore LMS hierarchy on the band in this proceeding. Doing so will allow all parties to go forward with less uncertainty. The public will be the largest beneficiary. Location services will be available sooner enhancing public safety and mobile productivity and the public will not have to finance a prolonged dispute on this issue.

Failing that, the Commission should establish an arbitration body with a charter to resolve such disputes in the public interest. At a minimum the Commission should add a distance variable to its antenna placement rules including indoor antennas. A cordless phone used on an upper story of a building on which an LMS rooftop site exists could legally devastate an LMS site under current rules.

### **Sharing vs Competitive Bidding**

*Summary.* It came as a complete shock to us to learn that the Commission was considering competitive bidding for spectrum we were already licensed on. Had we had any clue, earlier in our development cycle, that the Commission would change the rules so radically in the middle of the game we would have focused our efforts in another direction.

In our view, competitive bidding for already allocated spectrum, particularly allocated spectrum with incumbent licensees, is inappropriate and, in this case, unlikely to meet the Commission's fund raising objectives. The value of an LMS sub-band to the "Exclusive"

MTA licensee is substantially diminished by the presence of grandfathered licensees in the MTA and potential severe interference from other users of the band under the current rules. We would question whether the proceeds from an auction under these conditions would justify the administrative costs of such a proceeding.

As Uniplex was developing its LMS system it became apparent that we would have to share spectrum or make other arrangements with the other LMS providers since there were simply more of us than bands available. There has been considerable resistance to sharing among some of the LMS providers. Recently we participated in a sharing experiment with Pinpoint in Washington DC where they have a demonstration network operating. We were able to set up our stations and coordinate the time sharing technique in several days. We both agree that sharing is feasible and can be done very efficiently.

*Proposed.* The Commission should designate a sub band for multilateration LMS systems that are willing to share spectrum rather than participate in competitive bidding. Doing so would preserve and encourage small entrepreneurial companies in this service and increase the value of the band or bands available for bidding. The public may actually receive more net revenue from this approach as the band(s) available for bidding would have fewer grandfathered licensees.

Respectfully Submitted,

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